To: Poleck, Thomas[poleck.thomas@epa.gov]
From: Minnesota Pollution Control Agency
Sent: Tue 10/22/2013 1:55:25 PM
Subject: Minnesota Pollution Control Agency Sulfate Standard for Wild Rice Update

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You are subscribed to Sulfate Standard for Wild Rice for Minnesota Pollution Control Agency. This information has recently been updated, and is now available.

This bulletin provides an update on 2013 research efforts that are part of the Wild Rice Standards Study. Field and laboratory work associated with the components of the study are finishing up, and the MPCA is working closely with researchers at the University of Minnesota-Twin Cities and University of Minnesota-Duluth to ensure that reports are completed by the end of the year. See below for an update on each of the study components:

- **Outdoor container experiments** at the University of Minnesota-Duluth Research and Field Studies Station to determine the response of wild rice to a range of sulfate concentrations.
  - ○ Dr. John Pastor's research group finished the collection of seeds from the plants in early October and Dr. Amy Myrbo's field crews collected final water and sediment samples from eight outdoor container tanks during the week of October 6th.
  - ○ Researchers are analyzing and reviewing plant and water chemistry results and drafting reports.
- **Field survey of wild rice habitats** to determine characteristics correlated with wild rice stands.
  - ○ During the 2013 field season 22 sites were sampled on a one-time basis, and 17 sites were sampled intensively three times or more. Field work on these sites was completed by the end of September.
  - ○ Emphasis in 2013 was on data from higher-sulfate sites that may or may not grow rice.
  - ○ Field samples have been submitted to labs for analytical work and researchers are focusing on reviewing available results and report writing.
- **Controlled laboratory experiments** to determine the effect of sulfate and sulfide on wild rice germination and growth.
  - ○ Dr. John Pastor's lab is continuing experiments with sulfate and sulfide on wild rice germination and plant growth in hydroponic media. The sulfate testing is wrapping up, and development of the sulfide test methods are nearing completion, with sulfide testing to follow shortly.
- **Depth profiles at two field sites and four outdoor container tanks to quantify the sulfide, iron and other metals stratigraphy of sediment porewater.**
  - ○ The monthly collection of depth profiles using "peepers" (pore water equilibrators) at two field sites and four outdoor container tanks at the UMD research station was completed in early October by Dr. Johnson and his team. This work was also coordinated with Dr. Myrbo for the field sites and

Dr. Pastor and Dr. Myrbo at the outdoor container tanks.
  - Dr. Johnson will use this information to quantify the sulfate, sulfide, iron and metals stratigraphy of the sediment porewater in two different zones of the outdoor container tanks; one side with wild rice plants (rooted zone) and one side where there are no wild rice plants or other rooted plants growing (non-rooted zone).
- **Sediment incubation study** to explore the differences ambient temperature makes to the degree that elevated sulfate concentrations in water penetrate into underlying sediment, convert to sulfide and later release back into underlying water.
  - Dr. Johnson's team has completed these experiments and is analyzing results and interpreting data that are available. He will then be developing a simple reactive-transport model to characterize sulfate diffusion and reaction in sediment.

The next meeting of the Wild Rice Standards Study will be held on November 13, 2013 in St. Paul.

The MPCA will be reviewing reports from the various research efforts in early 2014 as well as additional information from literature surveys and field data.